FILE 'AGRICOLA' ENTERED AT 09:19:28 ON 18 OCT 2004

FILE 'BIOSIS' ENTERED AT 09:19:28 ON 18 OCT 2004
Copyright (c) 2004 The Thomson Corporation.

FILE 'EMBASE' ENTERED AT 09:19:28 ON 18 OCT 2004
COPYRIGHT (C) 2004 Elsevier Inc. All rights reserved.

FILE 'CAPLUS' ENTERED AT 09:19:28 ON 18 OCT 2004
USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.
PLEASE SEE "HELP USAGETERMS" FOR DETAILS.
COPYRIGHT (C) 2004 AMERICAN CHEMICAL SOCIETY (ACS)

=> s methionine and hydrophobic and substitution and protein and plant
L1 12 METHIONINE AND HYDROPHOBIC AND SUBSTITUTION AND PROTEIN AND PLANT

=> duplicate remove l1
DUPLICATE PREFERENCE IS 'BIOSIS, EMBASE, CAPLUS'
KEEP DUPLICATES FROM MORE THAN ONE FILE? Y/(N):n

PROCESSING COMPLETED FOR L1
L2 11 DUPLICATE REMOVE L1 (1 DUPLICATE REMOVED)

=> d l2 1-11 ti

L2 ANSWER 1 OF 11 EMBASE COPYRIGHT 2004 ELSEVIER INC. ALL RIGHTS RESERVED. on STN
TI Determinants of enzymatic specificity in the cys-met-metabolism PLP-dependent enzymes family: Crystal structure of cystathionine γ-lyase from yeast and intrafamiliar structure comparison.

L2 ANSWER 2 OF 11 CAPLUS COPYRIGHT 2004 ACS on STN
TI Analysis of **plant** α-tubulin with structural characteristics providing increased cold tolerance

L2 ANSWER 3 OF 11 BIOSIS COPYRIGHT (c) 2004 The Thomson Corporation. on STN
TI Engineered recombinant enteropeptidase catalytic subunit: Effect of N-terminal modification.

L2 ANSWER 4 OF 11 CAPLUS COPYRIGHT 2004 ACS on STN
TI The chaperone-like activity of a small heat shock **protein** is lost after sulfoxidation of conserved **methionines** in a surface-exposed amphipathic α-helix

L2 ANSWER 5 OF 11 BIOSIS COPYRIGHT (c) 2004 The Thomson Corporation. on STN DUPLICATE 1
TI A point mutation in a **plant** calmodulin is responsible for its inhibition of nitric-oxide synthase.

L2 ANSWER 6 OF 11 CAPLUS COPYRIGHT 2004 ACS on STN
TI High **methionine** derivatives of α-hordothionin for pathogen-control

L2 ANSWER 7 OF 11 CAPLUS COPYRIGHT 2004 ACS on STN
TI High-**methionine** derivatives of α-hordothionin and the transformation of improved **plant** crops

L2 ANSWER 8 OF 11 EMBASE COPYRIGHT 2004 ELSEVIER INC. ALL RIGHTS RESERVED. on STN
TI Extensive modifications for **methionine** enhancement in the β-barrels do not alter the structural stability of the bean seed storage **protein** phaseolin.

L2 ANSWER 9 OF 11 BIOSIS COPYRIGHT (c) 2004 The Thomson Corporation. on STN
TI Strategies for selecting mutation sites for **methionine** enhancement in the bean seed storage **protein** phaseolin.

L2 ANSWER 10 OF 11 BIOSIS COPYRIGHT (c) 2004 The Thomson Corporation. on STN
TI BINDING OF THE YEAST TRNA-MET ANTICODON BY THE COGNATE METHIONYL-TRNA SYNTHETASE INVOLVES AT LEAST TWO INDEPENDENT PEPTIDE REGIONS.

L2 ANSWER 11 OF 11 BIOSIS COPYRIGHT (c) 2004 The Thomson Corporation. on STN
TI ISOLATION AND CHARACTERIZATION OF QCR9 A NUCLEAR GENE ENCODING THE 7.3-KDA SUBUNIT 9 OF THE SACCHAROMYCES-CEREVISIAE UBIQUINOL CYTOCHROME C OXIDOREDUCTASE COMPLEX AN INTRON-CONTAINING GENE WITH A CONSERVED SEQUENCE OCCURRING IN THE INTRON OF COX4.

=> d l2 9 ibib ab

L2 ANSWER 9 OF 11 BIOSIS COPYRIGHT (c) 2004 The Thomson Corporation. on STN
ACCESSION NUMBER: 1994:82523 BIOSIS
DOCUMENT NUMBER: PREV199497095523
TITLE: Strategies for selecting mutation sites for **methionine** enhancement in the bean seed storage **protein** phaseolin.
AUTHOR(S): Dyer, John M.; Nelson, Jeffrey W.; Murai, Norimoto [Reprint author]
CORPORATE SOURCE: Dep. Biochemistry, Louisiana State Univ., Baton Rouge, LA 70803, USA
SOURCE: Journal of Protein Chemistry, (1993) Vol. 12, No. 5, pp. 545-560.
CODEN: JPCHD2. ISSN: 0277-8033.
DOCUMENT TYPE: Article
LANGUAGE: English
ENTRY DATE: Entered STN: 22 Feb 1994
Last Updated on STN: 23 Feb 1994

AB The complete three-dimensional structure of the bean seed storage **protein** phaseolin was generated from alpha-carbon coordinates by using molecular mechanic calculations. This structure was used as a template to simulate modifications aimed at increasing the **methionine** content of phaseolin. A hydrophilic, **methionine**-rich looping insert sequence was designed. Simulated mutagenesis shows that the insert might be accommodated in turn and loop regions of the **protein**, but not within an alpha-helix. **Methionine** content was also increased by the replacement of **hydrophobic** amino acids with **methionine** in the central core beta-barrels of the phaseolin **protein**. Calculations indicated that **methionine** can effectively replace conserved or variant leucine, isoleucine, and valine residues. However, alanine residues were much more sensitive to **substitution**, and demonstrated high variability in the effects of **methionine** replacement. Introduction of multiple **substitutions** in the barrel interior demonstrated that the replaced residues could interact favorably to relieve local perturbations caused by individual **substitutions**. Molecular dynamics simulations were also utilized to study the structural organization of phaseolin. The calculations indicate that there are extensive packing interactions between the major domains of phaseolin, which have important implications for **protein** folding and stability. Since the proposed mutant **proteins** can be produced and studied, the results presented here provide an ideal test to determine if there is a correlation between the

effects obtained by computer simulation and the effects of the mutations on the **protein** structure expressed in vivo.

=> d l2 8 ibib ab

L2 ANSWER 8 OF 11 EMBASE COPYRIGHT 2004 ELSEVIER INC. ALL RIGHTS RESERVED. on STN

ACCESSION NUMBER: 96001948 EMBASE
DOCUMENT NUMBER: 1996001948
TITLE: Extensive modifications for **methionine** enhancement in the β-barrels do not alter the structural stability of the bean seed storage **protein** phaseolin.
AUTHOR: Dyer J.M.; Nelson J.W.; Murai N.
CORPORATE SOURCE: Department of Biochemistry, Louisiana State University,Baton Rouge, LA 70803, United States
SOURCE: Journal of Protein Chemistry, (1995) 14/8 (665-678). ISSN: 0277-8033 CODEN: JPCHD2
COUNTRY: United States
DOCUMENT TYPE: Journal; Article
FILE SEGMENT: 029 Clinical Biochemistry
LANGUAGE: English
SUMMARY LANGUAGE: English

AB Common beans are widely utilized as a food source, yet are low in the essential amino acid **methionine**. As an initial step to overcome this defect the **methionine** content of the primary bean seed storage **protein** phaseolin was increased by replacing 20 evolutionarily variant **hydrophobic** residues with **methionine** and inserting short, **methionine**-rich sequences into turn and loop regions of the **protein** structure. **Methionine** enhancement ranged from 5 to 30 residues. An Escherichia coli expression system was developed to characterize the structural stability of the mutant **proteins**. **Proteins** of expected sizes were obtained for all constructs except for negative controls, which were rapidly degraded in E. coli. Thermal denaturation of the purified **proteins** demonstrated that both wild-type and mutant phaseolin **proteins** denatured reversibly at approximately 61°C. In addition, urea denaturation experiments of the wild-type and a mutant **protein** (with 30 additional **methionines**) confirmed that the structural stability of the **proteins** was very similar. Remarkably, these results indicate that the phaseolin **protein** tolerates extensive modifications, including 20 **substitutions** and two loop inserts for **methionine** enhancement in the β-barrel and loop structures, with extremely small effects on **protein** stability.

commands which can be used in this file.

=> file agricola biosisi embase caplus
'BIOSISI' IS NOT A VALID FILE NAME
Enter "HELP FILE NAMES" at an arrow prompt (=>) for a list of files
that are available. If you have requested multiple files, you can
specify a corrected file name or you can enter "IGNORE" to continue
accessing the remaining file names entered.
ENTER A FILE NAME OR (IGNORE):biosis
COST IN U.S. DOLLARS

	SINCE FILE ENTRY	TOTAL SESSION
FULL ESTIMATED COST	0.21	0.21

FILE 'AGRICOLA' ENTERED AT 09:27:46 ON 18 OCT 2004

FILE 'BIOSIS' ENTERED AT 09:27:46 ON 18 OCT 2004
Copyright (c) 2004 The Thomson Corporation.

FILE 'EMBASE' ENTERED AT 09:27:46 ON 18 OCT 2004
COPYRIGHT (C) 2004 Elsevier Inc. All rights reserved.

FILE 'CAPLUS' ENTERED AT 09:27:46 ON 18 OCT 2004
USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.
PLEASE SEE "HELP USAGETERMS" FOR DETAILS.
COPYRIGHT (C) 2004 AMERICAN CHEMICAL SOCIETY (ACS)

=> s vsp and plant
L1 268 VSP AND PLANT

=> duplicate remove l1
DUPLICATE PREFERENCE IS 'AGRICOLA, BIOSIS, EMBASE, CAPLUS'
KEEP DUPLICATES FROM MORE THAN ONE FILE? Y/(N):n
PROCESSING COMPLETED FOR L1
L2 146 DUPLICATE REMOVE L1 (122 DUPLICATES REMOVED)

=> s l2 and substitution
L3 2 L2 AND SUBSTITUTION

=> d l3 1-2 ibib ab

L3 ANSWER 1 OF 2 CAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 2004:836369 CAPLUS
TITLE: A single amino acid **substitution** in soybean **VSP**α increases its acid phosphatase activity nearly 20-fold
AUTHOR(S): Leelapon, Oranuch; Sarath, Gautam; Staswick, Paul E.
CORPORATE SOURCE: Department of Agronomy and Horticulture, University of Nebraska, Lincoln, NE 68583, USA
SOURCE: Planta (2004), 219(6), 1071-1079
CODEN: PLANAB; ISSN: 0032-0935
PUBLISHER: Springer GmbH
DOCUMENT TYPE: Journal
LANGUAGE: English
AB Soybean [Glycine max (L.) Merr.] contains two proteins called vegetative storage proteins (**VSPs**) that function as temporary storage reserves, but are also closely related to **plant** acid phosphatases of the haloacid dehalogenase (HAD) superfamily. This study examined the biochem. basis for the relatively low catalytic activity previously reported for these **VSPs**. The specific activity of purified recombinant **VSP**α on GMP was about 40-fold lower than for a related soybean root nodule acid phosphatase (APase), which had a specific activity of 845 U mg-1 protein. Conversion of Ser106 to Asp increased **VSP**α activity about 20-fold. This Asp residue is present in nodule APase and is a highly conserved nucleophile in the

HAD superfamily. Related **VSPs** from cultivated soybean and from three wild perennial soybeans, as well as a pod storage protein (PSP) from Phaseolus vulgaris L. all lack the catalytic Asp, suggesting they too are catalytically inefficient. Phylogenetic anal. showed the **VSPs** and PSP are more closely related to each other than to 21 other **VSP**-like proteins from several **plant** species, all of which have the nucleophilic Asp. This study suggests that loss of catalytic activity may be a requirement for the **VSPs** and PSP to function as storage proteins in legumes.

L3 ANSWER 2 OF 2 CAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 1999:388313 CAPLUS
DOCUMENT NUMBER: 131:40549
TITLE: The use of protein engineering method to alter the amino acid content of vegetative storage protein (**VSP**) and increase its nutritional value
INVENTOR(S): Rao, Gururaj A.; Sleister, Heidi Major
PATENT ASSIGNEE(S): Pioneer Hi-Bred International, Inc., USA
SOURCE: PCT Int. Appl., 42 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9929882	A2	19990617	WO 1998-US26209	19981210
WO 9929882	A3	19990916		
W: AL, AM, AT, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, CZ, DE, DE, DK, DK, EE, EE, ES, FI, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
RW: GH, GM, KE, LS, MW, SD, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
ZA 9811327	A	19990614	ZA 1998-11327	19981210
AU 9939083	A1	19990628	AU 1999-39083	19981210
PRIORITY APPLN. INFO.:			US 1997-988015	A1 19971210
			WO 1998-US26209	W 19981210

AB Methods for altering amino acid composition of **VSP** are provided, particularly to proteins whose three-dimensional structure is unknown. The method comprises creating interacting mols. to the native protein and selecting for engineered proteins which retain the native conformation by antibody binding assay. In this manner, the levels of essential amino acids in a protein can be increaseed yet the biol. activity of the protein maintained. Three **VSP** variants have been proposed and the methionine of proteins can be increaseed about 10-20%, more preferentially about 20-40% by using this method.